

REMARKS

Claims 13 – 25 are pending in the application of which claims 19 – 22 have been withdrawn. Claims 13 – 18 and 23 – 25 are presented for reconsideration and further examination in view of the foregoing amendments and following remarks.

In the outstanding Office Action, claims 15 and 16 were rejected under 35 U.S.C. § 112, first paragraph for lack of enablement; claims 15, 16, 20 and 21 were rejected under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement; claims 13 and 14 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,990,301 to Krishnakumar et al. in view of U.S. Patent No. 6,187,241 B1 to Swenson; and claims 17-18 and 23 – 25 were rejected under 35 U.S.C. § 103(a) as being obvious over the Krishnakumar et al. '301 patent

By this Response and Amendment, claim 15 is amended to correct the sequence of material injection steps and the rejections under § 112, first paragraph and the rejections under § 103(a) are all traversed and arguments in support thereof are provided.

It is respectfully submitted that the within amendments do not introduce new matter within the meaning of 35 U.S.C. § 132.

Rejections Under 35 U.S.C. § 112, First Paragraph – Enablement

The Examiner rejected claims 15, 16, 20, and 21 under 35 U.S.C. § 112, first paragraph as not enabling a person having ordinary skill in the art to make and use the invention.

Response

Claim 15 has been amended to overcome the rejections. As amended, Applicants respectfully traverse the rejections.

The instant invention, as claimed in claims 15 and 16 as herein amended and resubmitted, is directed to a method for operating a multi-component injection moulding form tool to produce 3-layered formed bodies.

As claimed in claims 15 and 16 as amended, during a first step in a moulding cycle, an outer jet chamber (corresponding to a component B) and an inner jet chamber (corresponding to a component C) are each in an opened condition and only a component B is conveyed. In a second step in the moulding cycle, the outer jet chamber is retained in the opened condition and the component B is conveyed therethrough while the inner jet chamber is retained in the opened condition and the component C is simultaneously conveyed therethrough. In a third step in the moulding cycle, conveyance of component C is halted, while the outer jet chamber is retained in the open condition and further component B is conveyed therethrough. In a fourth step in the moulding cycle (following a cooling phase) further component B is conveyed to compensate for shrinkage during the cooling. To complete the cycle both the inner and outer jet chambers are closed.

The Examiner argues that the specification does not teach how a process could be performed such that the barrier component C would amount to five percent or less of the overall volume. However, claim 15 has been amended to correct the sequence and designations of the respective conveyed materials. Support for amended claim 15 is found on page 5, line 37 through page 6, line 37 of the original specification. As disclosed in the originally filed specification at page 6, the barrier component C is held to five percent or less. Therefore, Applicants submit that as herein amended, claims 15 and 16 are enabled by the originally filed specification.

The rejections to claims 20 and 21 have been rendered moot as those claims have been

withdrawn. Accordingly, reconsideration and withdrawal of the rejections is respectfully requested.

Rejections Under 35 U.S.C. § 112, First Paragraph – Written Description

The Examiner rejected claims 15, 16, 20, and 21 under 35 U.S.C. §112, first paragraph as not complying with the written description requirement of said section.

Response

The arguments with respect to the Examiner's enablement rejection under 35 U.S.C. §112, first paragraph are herein incorporated by reference. Applicants respectfully traverse the rejections.

"The written description requirement does not require the applicant[s] to describe exactly the subject matter claimed." *Union Oil Co. of California v. Atlantic Richfield Co.*, 208 F.3d 989, 997 (Fed. Cir. 2000). "The content of the drawings may also be considered in determining compliance with the written description requirement." *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983) (citations omitted).

The process as claimed in claim 15 forms a three-layered preform, rather than a five-layered preform as the Examiner argues. Applicants direct the Examiner's attention to Fig. 4 and page 10, line 33 - page 11, line 11 of the original application. Figure 4 shows a preform having three layers. And, the relevant section of the specification shows that a first material of the preform is injected into a mold and a second material, which is more viscous than the first, is injected into the mold thereafter. The less viscous material surrounds the more viscous material such that a first layer (of less viscous material), a second layer (of more viscous material) and a third layer of the first less viscous material is formed. Inherently, this is a three layered, preform. Therefore, the invention is adequately described in the specification, and the Applicants respectfully request the Examiner to reconsider and withdraw the rejection.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over U.S. patent no. 4,990,301 B1 to Krishnakumar et al. in view of U.S. patent no. 6,187,241 B1 to Swenson.

Response

Applicants respectfully traverse the rejections.

As claimed in claim 13, a multi-component injection moulding form tool having a hot runner nozzle is provided with a needle shut-off mechanism adapted to release or block one inner jet chamber and one outer jet chamber of the nozzle. The needle shut-off mechanism has a movable needle and at least one first plunger and one second plunger cooperating therewith and arranged such that the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers. In one particularly preferred embodiment of the invention, a component “A” having a first viscosity can be selectively injected through the one inner jet chamber to form a thin surface layer of new material. A component “B” having a viscosity greater than the viscosity of the component “A” can be selectively injected as a filler material through the one outer jet chamber. The method has an operating cycle comprising in sequence the following steps:

Positioning the needle into a selected first one of the plurality of positions so that the one inner jet chamber and the one outer jet chamber are opened;

Conveying the surface layer forming component “A” through the one inner jet chamber there while not conveying the filler material component “B” through the one outer jet chamber;

Thereafter conveying component “B” through the one outer jet chamber in order to produce a three-layered preform with a component B content of over 35 %;

Cooling the components A and B in a cooling phase there while replacing material shrunk during the cooling phase with further component “B” such that the component “B” content amounts to over 35 vol. %; and, in order to complete the cycle,

Positioning the needle into a selected other of the plurality of positions whereby both the one inner jet chamber and the one outer jet chamber are closed.

In contrast, the Krishnakumar ‘301 patent discloses at col. 2, lines 65 – 68, a single gate pin 46 controlled by a positioning device 48 (see also Fig. 1). The Swenson ‘241 patent discloses at col. 8, lines 33 et seq., a throttle valve T controlled by an adjusting rod R (see also Figs. 16 – 19). Neither of the cited references discloses a needle shut-off mechanism having a movable needle and at least one first plunger and one second plunger cooperating therewith and arranged such that the plungers are movable within a cylindrical barrel, each plunger being longitudinally shiftable in such a manner that the needle is brought into a selected one of a plurality of releasing/blocking positions in the one inner and one outer jet chambers as claimed in claim 13. To the contrary, Swenson discloses at col. 8, lines 60 – 61 that “the movable throttle pin is not used to initiate nor terminate the flow of any material for any layer.” Neither of the cited references discloses cooling the components A and B in a cooling phase while replacing material shrunk during the cooling phase with further component “B” such that the component “B” content amounts to over 35 vol. %; and, in order to complete the cycle. It is therefore submitted that the combination of references asserted by the Examiner fails to teach all of the limitations as claimed in claim 13.

It is therefore submitted that claim 13, as previously amended, and as herein resubmitted without further amendment, is patentable over the cited combination of references. Claim 14,

dependent from claim 13, is asserted to be patentable over the cited combination for at least the same reasons that claim 13 is patentable thereover.

Accordingly, reconsideration and withdrawal of the rejections of claim 13 and 14 is respectfully requested.

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 17, 18 and 23 – 25 under 35 U.S.C. §103(a) as being unpatentable over U.S. patent no. 4,990,301 B1 to Krishnakumar et al.

Response

Applicants respectfully traverse the rejections. The arguments made with respect to claims 13 and 14 above are herein incorporated by reference.

As claimed in claim 17 of the present invention, during a first step in a moulding cycle an inner jet chamber (corresponding to a component “C”), an outer jet chamber (corresponding to a component “A”), and an intermediate jet chamber located between the inner and outer jet chambers (corresponding to a component “B”) are each in an opened condition and only the component “A” is conveyed through the outer jet chamber. In a second step in the moulding cycle conveyance of the component “A” is halted and components “B” and “C” are each simultaneously conveyed. In a third step in the moulding cycle conveyance of component “C” is halted and further component “B” is conveyed to compensate for shrinkage during cooling.

Even assuming *arguendo* that materials shrink upon cooling, neither of the cited references discloses replacing material shrunk during the cooling phase with further component “B”, as claimed in claim 17.

It is therefore submitted that claim 17, as herein resubmitted without further amendment, is patentable over the cited combination of references. Claims 18 and 23 – 25, dependent from claim 17, are asserted to be patentable for at least the reasons that claim 17 is patentable thereover.

Accordingly, reconsideration and withdrawal of the rejections is respectfully requested.

CONCLUSION


In light of the foregoing, Applicants submit that the application is in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

Respectfully submitted,

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